

## **ABSTRACT**

Method and apparatus for treating a sample to acquire multidimensional spectra within a single scan that partitions a sample into a set of independent subensembles endowed with different resonance frequencies. A polychromatic irradiation of the sample is implemented whereby the various subensembles are selectively manipulated by a time-incremented series of excitation or refocusing sequences. Thereafter, a homogeneous sequence capable of generating an observable spectral signal from each of the subensembles is applied with simultaneous monitoring of the observable signals arising from the various subensembles in a resolved fashion. the observable signals acquired in this manner are processed into a complete multidimensional spectral data set.